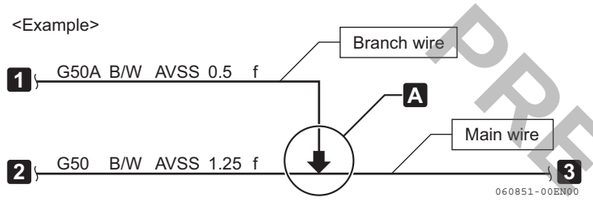
2-9 Wiring Diagram

■ How to Read Wiring Diagrams

● Intersections and Wire Connections

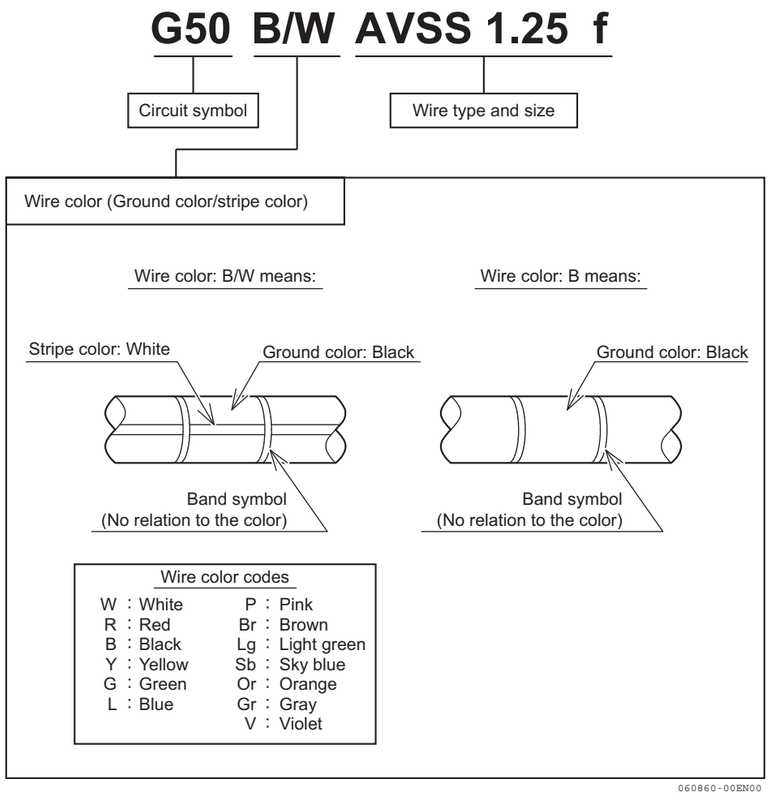


The point of arrow **A** on the main wire shown in the figure above represents an intersection of the branch wire and the main wire.
The direction of the arrow indicates which one is the branch wire (the arrowed line represents the branch wire) and also shows the division between the branch wire and the main wire.

In the example above, the wires are divided as follows.

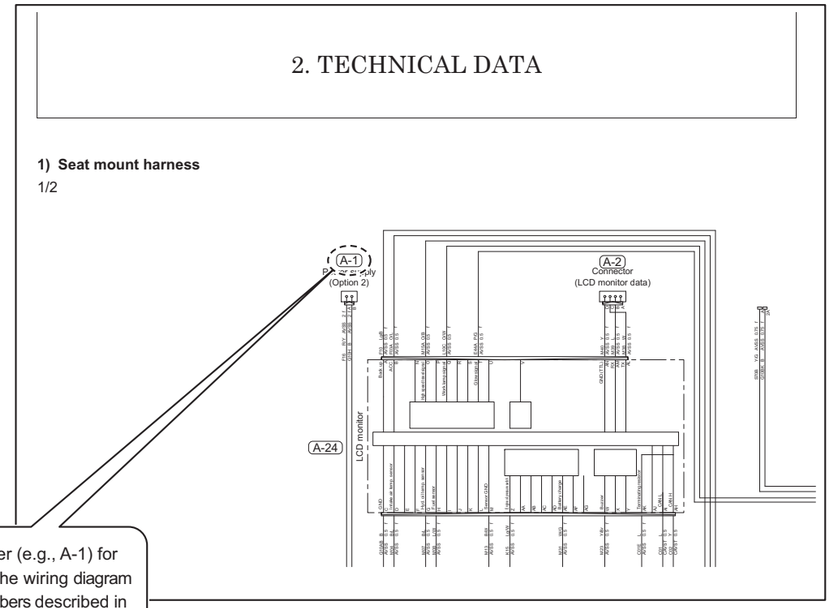
1 to the point of arrow **A** : Branch wire G50A B/W AVSS 0.5 f
2 to **3** : Main wire G50 B/W AVSS 1.25 f

● How to Read Wiring Symbols

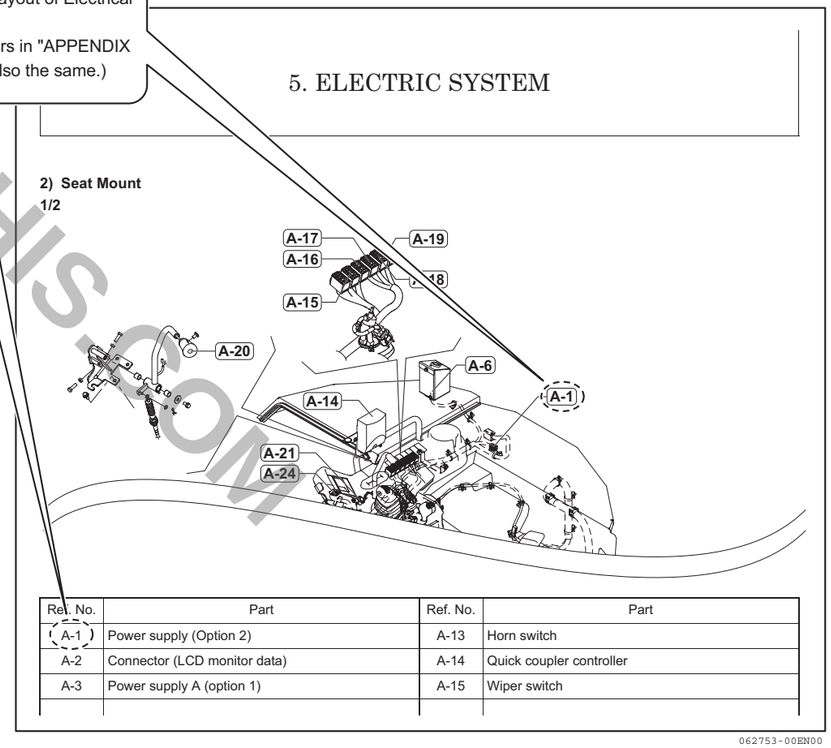


● Reference numbers

<Example>



Each reference number (e.g., A-1) for electric equipment in the wiring diagram corresponds to the numbers described in Section "5-1-1 Parts Layout of Electrical Equipment".
(The reference numbers in "APPENDIX Wiring Diagram" are also the same.)

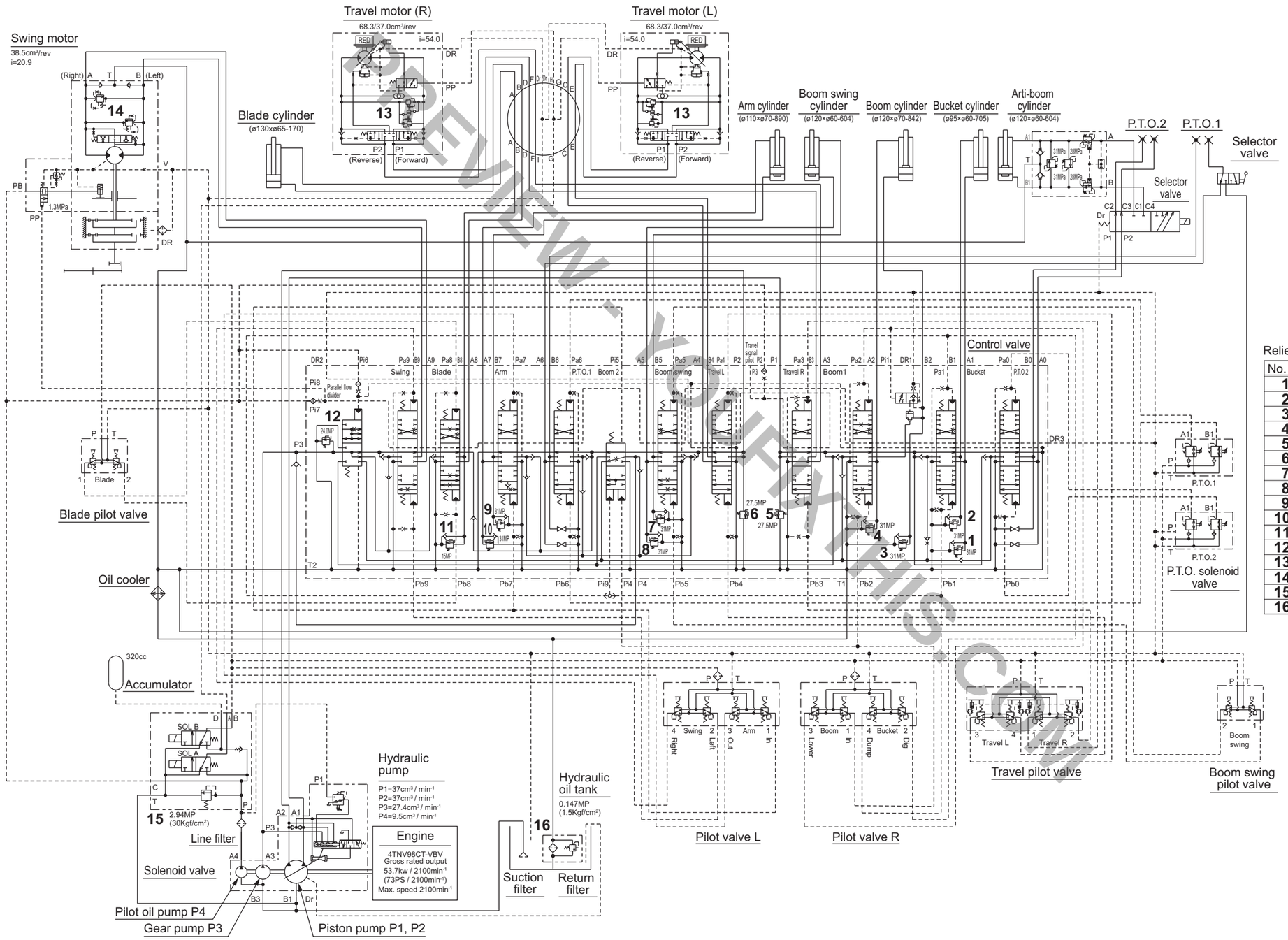


Ref. No.	Part	Ref. No.	Part
A-1	Power supply (Option 2)	A-13	Horn switch
A-2	Connector (LCD monitor data)	A-14	Quick coupler controller
A-3	Power supply A (option 1)	A-15	Wiper switch

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2-8 Hydraulic Circuit Schematic

Applicable S/N: 20501 to 21087



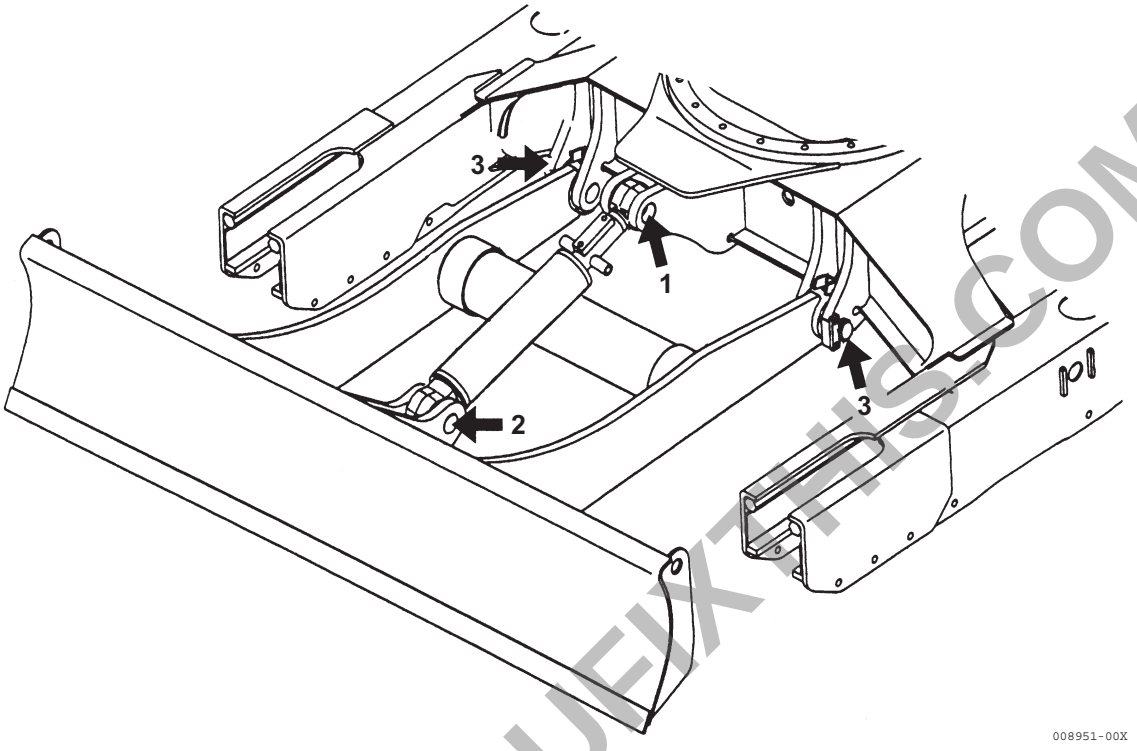
Relief valve set pressure

No.	PSI	MPa
1	4496	31.0
2	4496	31.0
3	4496	31.0
4	4496	31.0
5	3989	27.5
6	3989	27.5
7	4496	31.0
8	4496	31.0
9	4496	31.0
10	4496	31.0
11	2176	15.0
12	3481	24.0
13	3989	27.5
14	3553	24.5
15	426	2.94
16	21	0.147

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3-6-2 Blade Moving Device



Unit : in. (mm)

No.	Applicable model: SV100-2A-2PB	Standard	Wear limit	
	Measuring point		Pin	Bore of bush or hole
1	Blade cylinder, rod	Ø2.36 (Ø60)	-0.02 (-0.5)	+0.02 (+0.5)
2	Blade cylinder, bottom	Ø2.36 (Ø60)		
3	Blade fulcrum	Ø2.36 (Ø60)		

Note : *Allowable clearance between pin and bore of bush or hole is 0.04 in. (1.0 mm).*

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3-7 List of Tightening Torque

3-7-1 Machine

Applicable model			SV100-2A-2PB		
Equipment			Thread size	Tightening torque ft•lbf (N•m)	Adhesive
	No	Tightening part			
Engine / Electrical equipment					
	1	Engine mount vibroisolating rubber	M16 × 130	195.3 to 224.2 (264.8 to 304)	Three Bond 1324
	2	Engine × Engine mount F (Radiator side)	M10 × 35 (11T)	61.4 (83.3)	Three Bond 1324
	3	Engine × Engine mount R (Flywheel side)	M12 × 30 (10.9)	79.7 to 94.4 (108 to 128)	Three Bond 1324
	4	Air cleaner	M8 × 20	14.5 to 16.7 (19.6 to 22.6)	-
	5	Air cleaner intake hose (Engine side)	Hose clip 70	1.8 to 2.5 (2.5 to 3.4)	-
	6	Air cleaner intake hose (Air cleaner side)	Hose clip 90	1.8 to 2.5 (2.5 to 3.4)	-
	7	Air cleaner intake hose (Air cleaner intake side)	Hose clip 90	0.9 to 1.1 (1.2 to 1.5)	-
	8	Cooling water hose	Hose clip 48	1.8 to 2.5 (2.5 to 3.4)	-
	9	Fuel gauge unit	M5×12 (Pan-head machine screw)	0.87 to 1.08 (1.18 to 1.47)	-
	10	Fuel tank × Bracket SWP × Clamp	M8 × 16	9.4 to 12.3 (12.8 to 16.7)	-
	11	Fuel drain valve	R3/8	14.5 to 21.7 (19.6 to 29.4)	Sealing tape Loctite 577
	12	Fuel tank holding band (Tank holding (upper) side)	Nut 10	1.8 to 2.1 (2.5 to 2.9)	-
	13	Fuel tank holding band (Lock nut (lower) side)	Nut 10	18.1 to 23.9 (24.5 to 32.4)	-
	14	Fuel tank bracket L × Frame	M10 × 30	32.5 to 43.4 (44.1 to 58.9)	Three Bond 1324
	15	Battery holding rod (Battery holding side)	Nut 8	2.2 (2.94)	-
	16	Battery holding rod (Lock nut side)	Nut 8	9.4 to 12.3 (12.8 to 16.7)	-
	17	LCD monitor × Panel	M5 × 20	1.88 to 2.43 (2.55 to 3.3)	-
	18	Air conditioner hose joint	M6 × 20	5.9 to 8.9 (8 to 12)	-
	19	Air conditioner hose × Receiver dryer	M6 × 25	5.9 to 8.9 (8 to 12)	-
	20	Air conditioner hose × Condenser (Condenser upper side)	M22 × 1.5(Hose joint)	14.8 to 18.4 (20 to 25)	-
	21	Air conditioner hose × Condenser (Condenser lower side)	M16 × 1.5(Hose joint)	8.9 to 11.1 (12 to 15)	-
	22	Air conditioner hose × Compressor	M8 × 25	14.8 to 18.4 (20 to 25)	-
	23	Safety switch (Cut-off lever)	Nut 18 (Fine thread)	21.7 to 25.3 (29.4 to 34.3)	-
	24	Engine control dial	Nut 9 (Fine thread)	1.08 or less (1.47 or less)	-

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Error Code List

Error code	Classification	Error description	Detection condition	Causes	Corrective measures
00 000051.03	Caution	Intake throttle position sensor malfunction: High voltage	The sensor voltage is higher than 4.8 V when the engine is not cranking.	1. Improper connector engagement, 2. Faulty wire harness, 3. Intake throttle position sensor failure, 4. Engine ECU internal circuit failure	Check the connector, wire harness, intake throttle position sensor and engine ECU. Turn the starter switch to the "OFF" position and then to the "ON" position to check if the error code is displayed again.
00 000051.04	Caution	Intake throttle position sensor malfunction: Low voltage	The sensor voltage is lower than 0.2 V when the engine is not cranking.	1. Improper connector engagement, 2. Faulty wire harness, 3. Intake throttle position sensor failure, 4. Engine ECU internal circuit failure	Check the connector, wire harness, intake throttle position sensor and engine ECU. Turn the starter switch to the "OFF" position and then to the "ON" position to check if the error code is displayed again.
00 000091.03	Caution	Accelerator sensor malfunction: High voltage	The sensor voltage is higher than 4.6 V.	1. Improper connector engagement, 2. Faulty wire harness, 3. Accelerator sensor failure, 4. Engine ECU internal circuit failure	Check the connector, wire harness, accelerator sensor and engine ECU. Turn the starter switch to the "OFF" position and then to the "ON" position to check if the error code is displayed again.
00 000091.04	Caution	Accelerator sensor malfunction: Low voltage	The sensor voltage is lower than 0.2 V.	1. Improper connector engagement, 2. Faulty wire harness (Sensor 5V disconnection or short to ground), 3. Accelerator sensor failure, 4. Engine ECU internal circuit failure	Check the connector, wire harness, accelerator sensor and engine ECU. Turn the starter switch to the "OFF" position and then to the "ON" position to check if the error code is displayed again.
00 000100.01	Warning	Low engine oil pressure alarm	After the engine starts, the engine oil pressure switch stays on for a specific period of time at an engine speed of 600 min^{-1} or more and at a battery voltage of 9V or more.	1. Low engine oil pressure, 2. Engine lubrication system failure, 3. Faulty wire harness (Engine oil pressure switch wire short to ground), 4. Engine oil pressure switch failure (Short to ground on a wire inside the engine oil pressure switch), 5. Engine ECU internal circuit failure	Check the amount of engine oil, engine lubrication system, wire harness, engine oil pressure switch and engine ECU. Turn the starter switch to the "OFF" position and then to the "ON" position to check if the error code is displayed again.
00 000100.04	Warning	Engine oil pressure switch disconnection	Before the engine starts with the starter switch in the "ON" position, the engine oil pressure switch stays off for one second at a battery voltage of 9 V or more.	1. Improper connector engagement, 2. Faulty wire harness (Engine oil pressure switch wire disconnection or short to power), 3. Engine oil pressure switch failure (Wire disconnection or short to power on a wire inside the engine oil pressure switch), 4. Engine ECU internal circuit failure	Check the connector, wire harness, engine oil pressure switch and engine ECU. Turn the starter switch to the "OFF" position and then to the "ON" position to check if the error code is displayed again.
00 000102.03	Warning	EGR low pressure-side sensor malfunction: High voltage	The sensor voltage is higher than 4.8 V when the engine is not cranking.	1. Improper connector engagement, 2. Faulty wire harness (Sensor signal wire short to ground), 3. EGR pressure sensor failure (Improper sensor output due to short to ground on a wire inside the EGR pressure sensor), 4. Engine ECU internal circuit failure	Check the connector, wire harness, EGR pressure sensor and engine ECU. Turn the starter switch to the "OFF" position and then to the "ON" position to check if the error code is displayed again.
00 000102.04	Warning	EGR low pressure-side sensor malfunction: Low voltage	The sensor voltage is lower than 0.2 V when the engine is not cranking.	1. Improper connector engagement, 2. Faulty wire harness, 3. EGR pressure sensor failure, 4. Engine ECU internal circuit failure	Check the connector, wire harness, EGR pressure sensor and engine ECU. Turn the starter switch to the "OFF" position and then to the "ON" position to check if the error code is displayed again.
00 000102.13	Warning	EGR low pressure-side sensor malfunction: Abnormal learning value	The final offset value for the intake manifold pressure is lower than the threshold value or higher than the threshold value.	1. Improper connector engagement, 2. Faulty wire harness, 3. EGR pressure sensor failure, 4. Engine ECU internal circuit failure	Check the connector, wire harness, EGR pressure sensor and engine ECU. Turn the starter switch to the "OFF" position and then to the "ON" position to check if the error code is displayed again.
00 000105.03	Warning	Intake manifold temperature sensor malfunction: High voltage	The sensor voltage is higher than 4.8 V when the engine is not cranking.	1. Improper connector engagement, 2. Faulty wire harness, 3. Intake manifold temperature sensor failure, 4. Engine ECU internal circuit failure	Check the connector, wire harness, intake manifold temperature sensor and engine ECU. Turn the starter switch to the "OFF" position and then to the "ON" position to check if the error code is displayed again.
00 000105.04	Warning	Intake manifold temperature sensor malfunction: Low voltage	The sensor voltage is lower than 0.2 V when the engine is not cranking.	1. Improper connector engagement, 2. Faulty wire harness, 3. Intake manifold temperature sensor failure, 4. Engine ECU internal circuit failure	Check the connector, wire harness, intake manifold temperature sensor and engine ECU. Turn the starter switch to the "OFF" position and then to the "ON" position to check if the error code is displayed again.
00 000108.03	Caution	Atmospheric pressure sensor malfunction: High voltage	The sensor voltage is higher than 4.8 V when the engine is not cranking.	1. Failure of atmospheric pressure sensor inside engine ECU, 2. Engine ECU internal circuit failure	Check the atmospheric pressure sensor and engine ECU. Turn the starter switch to the "OFF" position and then to the "ON" position to check if the error code is displayed again.
00 000108.04	Caution	Atmospheric pressure sensor malfunction: Low voltage	The sensor voltage is lower than 0.2 V when the engine is not cranking.	1. Failure of atmospheric pressure sensor inside engine ECU, 2. Engine ECU internal circuit failure	Check the atmospheric pressure sensor and engine ECU. Turn the starter switch to the "OFF" position and then to the "ON" position to check if the error code is displayed again.
00 000108.10	Caution	Abnormal atmospheric pressure sensor characteristics	The final offset values for both the intake manifold pressure and the exhaust manifold pressure remain at 5 kPa or higher for 600 ms.	1. Failure of atmospheric pressure sensor inside engine ECU, 2. Engine ECU internal circuit failure, 3. Abnormal characteristics of both EGR high pressure-side and low pressure-side sensors, 4. Obstruction due to foreign matter in the sensor area or frozen sensor	Check the atmospheric pressure sensor and engine ECU. Turn the starter switch to the "OFF" position and then to the "ON" position to check if the error code is displayed again.
00 000110.00	Warning	Abnormally-high coolant temperature (Overheating)	60 seconds after the engine starts, the coolant temperature remains at 110°C or higher for 20 seconds.	1. Engine overheating, 2. Insufficient engine coolant, 3. Engine cooling system failure, 4. Coolant temperature sensor system failure	Check the amount of engine coolant, engine cooling system and coolant temperature sensor system. Turn the starter switch to the "OFF" position and then to the "ON" position to check if the error code is displayed again.

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Disassembly of Cylinder Head

Prepare a clean, flat working surface on a workbench large enough to accommodate the cylinder head assembly. Discard all gaskets, O-rings and seals. Use new gaskets, O-rings and seals on reassembly of the cylinder head.

1. Drain the coolant from the engine into a suitable container.

NOTICE

Identify all parts and their location using an appropriate method. It is important that all parts are returned to the same position during the reassembly process.

2. Disconnect the electrical wire from the glow plug, injector, intake throttle, EGR valve and sensors **(Figure 4-2-2, (1))**.

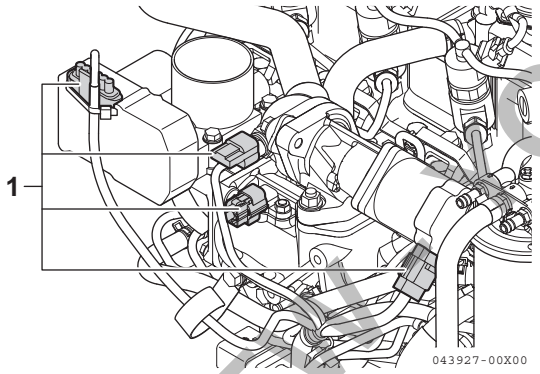


Figure 4-2-2

3. Disconnect the fuel pipes from the fuel filter, if the fuel filter is mounted on the intake manifold.
4. Remove the intake throttle, EGR valve and fuel filter on the intake manifold if required (discard the all gasket).
5. Remove the intake manifold bolts **(Figure 4-2-3, (1))**. Remove the intake manifold **(Figure 4-2-3, (2))**. Discard the intake manifold gasket **(Figure 4-2-3, (3))**.

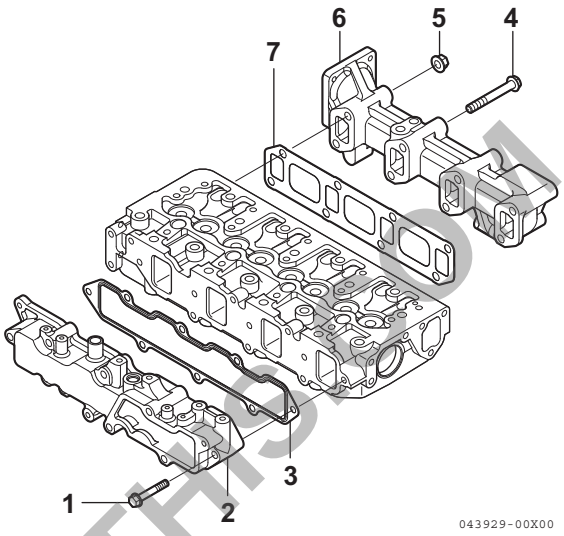
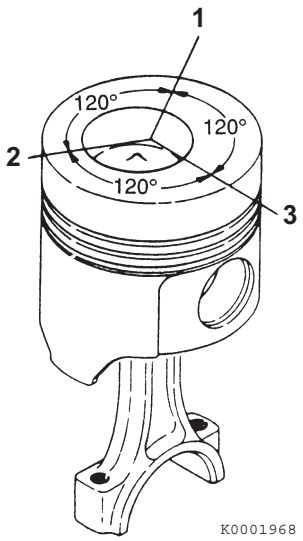


Figure 4-2-3

6. Disconnect the electrical wire from the diesel particulate filter if mounted.
7. Remove the diesel particulate filter from the engine (discard the all gasket).
8. Remove the exhaust manifold bolts **(Figure 4-2-3, (4))** and nuts **(Figure 4-2-3, (5))**. Remove the exhaust manifold **(Figure 4-2-3, (6))** and the exhaust manifold gasket **(Figure 4-2-3, (7))**.
9. Remove the coolant pump. *See Disassembly of Engine Coolant Pump on page 4-4-6.*
10. Remove the high-pressure lines and fuel injectors from the cylinder head. *See Removal of Injector on page 4-3-8.*

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1 – Top compression ring end gap
2 – Second compression ring end gap
3 – Oil ring end gap

Figure 4-2-90

■ Installation of crankshaft

1. If removed, reinstall the keys and timing gear on the crankshaft.
2. Reinstall new bearing inserts **(Figure 4-2-91, (1))** and thrust bearing **(Figure 4-2-91, (2))** in the cylinder block and main bearing caps. Apply a liberal coat of clean engine oil to the bearings and crankshaft journals.
3. Place the crankshaft into the engine.

NOTICE

The main bearing caps are numbered and have arrows for proper positioning. The No. 1 cap is at the flywheel end. The arrows point toward the flywheel end of the engine.

4. Reinstall the main bearing caps **(Figure 4-2-91, (3))**.
5. Apply a light coat of clean engine oil to the bearing cap bolts and tighten the bolts to the specified torque in two stages (1/2 then full torque). *See "3-7-2 Engine Tightening Torque" section for tightening torque.*

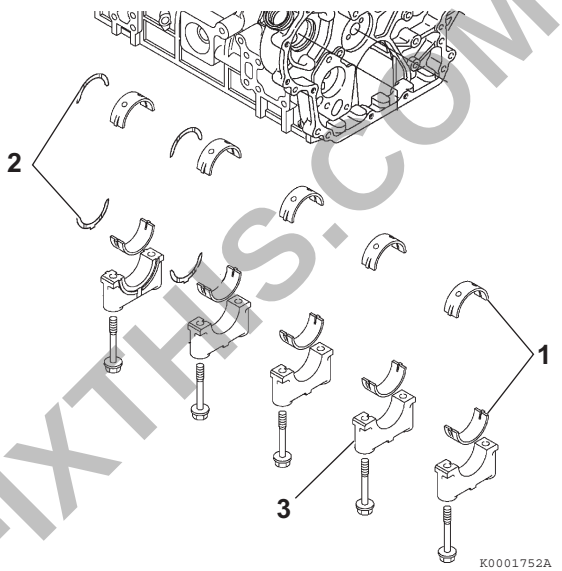


Figure 4-2-91

6. Rotate the crankshaft to assure it turns freely.
7. Apply ThreeBond Liquid Gasket No. 1207F, YANMAR Part No. 977770-1207F to the mounting flange of the seal housing **(Figure 4-2-92, (2))**.
8. Align the seal housing with the two dowel pins.
9. Reinstall seal housing and seal assembly.
10. Reinstall the flywheel **(Figure 4-2-92, (1))** and tighten the bolts to the specified torque. *See "3-7-2 Engine Tightening Torque" section for tightening torque.*

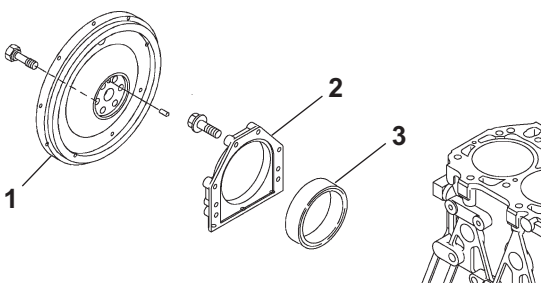


Figure 4-2-92

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CONTENTS

CHAPTER 1
GENERAL CAUTIONS FOR MAINTENANCE WORK

1-1 Correct Work 1-1
1-2 Safety Precautions 1-1
1-3 Preparations 1-1
1-4 Cautions for Disassembly and Reassembly 1-1
1-5 Cautions for Removal and Installation of Hydraulic Equipment 1-2
1-6 Cautions for Removal and Installation of Hydraulic Piping 1-2
1-7 Cautions for Handling Seals 1-3
1-8 Correct Installation of Hydraulic Hose 1-3
1-9 Specifications of Hydraulic Hose 1-6
1-10 Air Release of Hydraulic Equipment 1-8

CHAPTER 2
TECHNICAL DATA

2-1 Specifications 2-1-1
2-2 Outline Drawing and Working Area 2-2-1
2-2-1 W/O Quick Coupler 2-2-1
2-3 Weight List of Main Parts 2-3-1
2-4 Lifting Capacity List 2-4-1
2-4-1 W/O Quick Coupler 2-4-1
2-5 Specifications for Attachment 2-5-1
2-6 Periodic Inspection and Servicing 2-6-1
2-7 Fuel, Lube Oil and Grease Recommended 2-7-1
2-8 Hydraulic Circuit Schematic 2-8-1
2-9 Wiring Diagram 2-9-1

CHAPTER 3
SERVICE STANDARDS

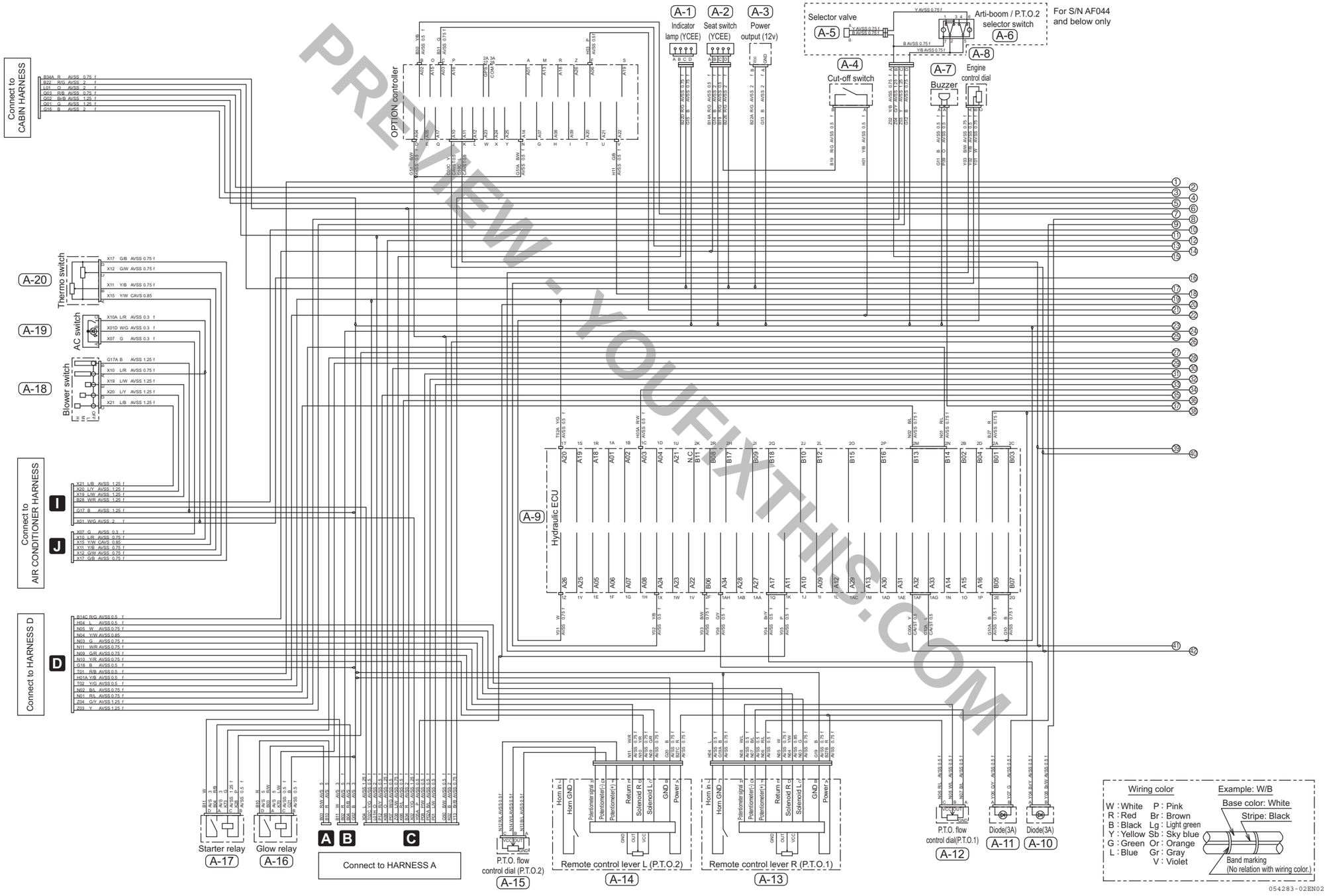
3-1 Machine Performance 3-1-1
3-2 Engine 3-2-1
3-3 Undercarriage 3-3-1
3-3-1 Rubber Crawler Specifications 3-3-1
3-3-2 Steel Crawler Specifications 3-3-2
3-3-3 Common Specifications of Steel & Rubber Crawlers 3-3-3
3-4 Controls 3-4-1
3-5 Hydraulic Equipment 3-5-1
3-5-1 Hydraulic Cylinders 3-5-1
3-6 Implement 3-6-1
3-6-1 Front Attachments 3-6-1
3-6-2 Blade Moving Device 3-6-2
3-7 List of Tightening Torque 3-7-1
3-7-1 Machine 3-7-1
3-7-2 Engine 3-7-4
3-7-3 Tightening Torque for General Bolts and Nuts 3-7-5
3-7-4 Hydraulic Fitting 3-7-6
3-8 Pressure Adjustment 3-8-1

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2. TECHNICAL DATA

1) Harness B

1/3



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⚠ WARNING

Exposure Hazard!



- Wear personal protective equipment such as gloves, work shoes, eye and hearing protection as required by the task at hand.

- Never wear jewelry, unbuttoned cuffs, ties or loose-fitting clothing when you are working near moving/rotating parts such as the cooling fan, flywheel or PTO shaft.
- Always tie back long hair when you are working near moving/rotating parts such as a cooling fan, flywheel, or PTO shaft.
- Never operate the engine while wearing a headset to listen to music or radio because it will be difficult to hear the alert signals.
- Failure to comply could result in death or serious injury.

⚠ WARNING

Burn Hazard!



- If you must drain the engine oil while it is still hot, stay clear of the hot engine oil to avoid being burned.

- Always wear eye protection.
- Wait until the engine cools before you drain the engine coolant. Hot engine coolant may splash and burn you.
- Keep your hands and other body parts away from hot engine surfaces such as the muffler, exhaust pipe, turbocharger (if equipped) and engine block during operation and shortly after you shut the engine down. These surfaces are extremely hot while the engine is operating and could seriously burn you.
- Failure to comply could result in death or serious injury.

⚠ WARNING

Burn Hazard!



- Batteries contain sulfuric acid. Never allow battery fluid to come in contact with clothing, skin or eyes. Severe burns could result. Always wear safety goggles and protective clothing when servicing the battery. If battery fluid contacts the eyes and/or skin, immediately flush the affected area with a large amount of clean water and obtain prompt medical treatment.
- Failure to comply could result in death or serious injury.

⚠ WARNING

High-Pressure Hazard!



- Avoid skin contact with the high-pressure diesel fuel spray caused by a fuel system leak such as a broken fuel injection line. High-pressure fuel can penetrate your skin and result in serious injury. If you are exposed to high-pressure fuel spray, obtain prompt medical treatment.
- Never check for a fuel leak with your hands. Always use a piece of wood or cardboard. Have your authorized YANMAR industrial engine dealer or distributor repair the damage.
- Failure to comply could result in death or serious injury.

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■ Removal of crankshaft

1. Remove the flywheel **(Figure 4-2-56, (1))** from the crankshaft.
2. Remove the bolts from the rear oil seal assembly **(Figure 4-2-56, (2-3))**. Remove the assembly from the engine.

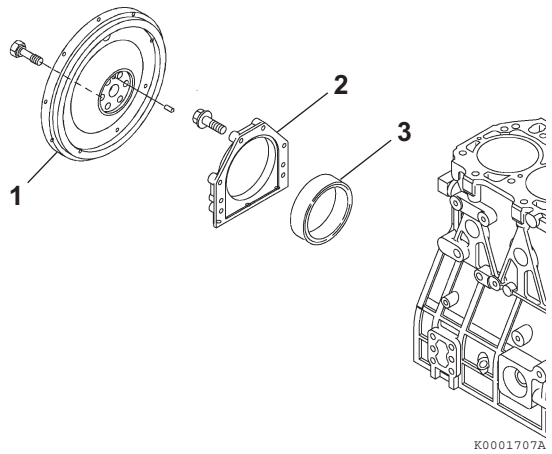


Figure 4-2-56

3. Before removing the main bearing caps, measure the crankshaft end play. Use either of the following two methods.
   - **Method A:** Install a dial gauge **(Figure 4-2-57, (1))** on the cylinder block. Move the crankshaft **(Figure 4-2-57, (2))** in and out to measure the end play. Record the measurement.

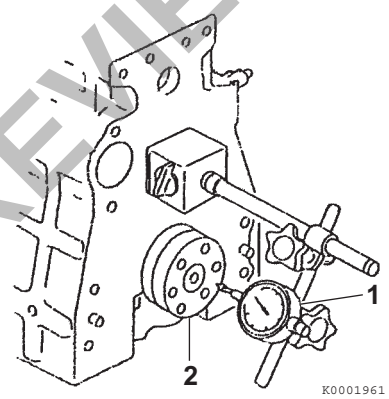


Figure 4-2-57

   - **Method B:** Use a feeler gauge to measure the clearance **(Figure 4-2-58, (3))** between the thrust bearing **(Figure 4-2-58, (1))** and crankshaft **(Figure 4-2-58, (2))**. Record the measurement. *See "3-2 Engine Service Standard" section for the service limit.*

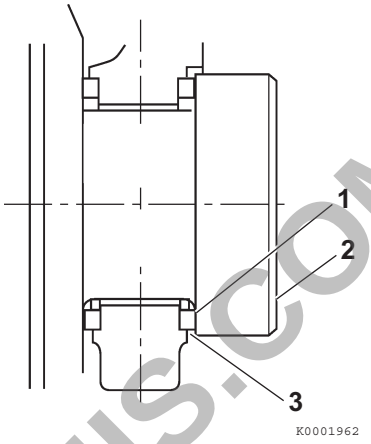


Figure 4-2-58

4. Remove the main bearing caps **(Figure 4-2-59, (3))**. Be sure to note the markings on the main bearing caps, or mark them yourself, so they can be reinstalled in the same order as they were removed. Do not remove the bearing inserts at this time.

   Note: The "arrows" on the main bearing caps point to the flywheel end of the engine.

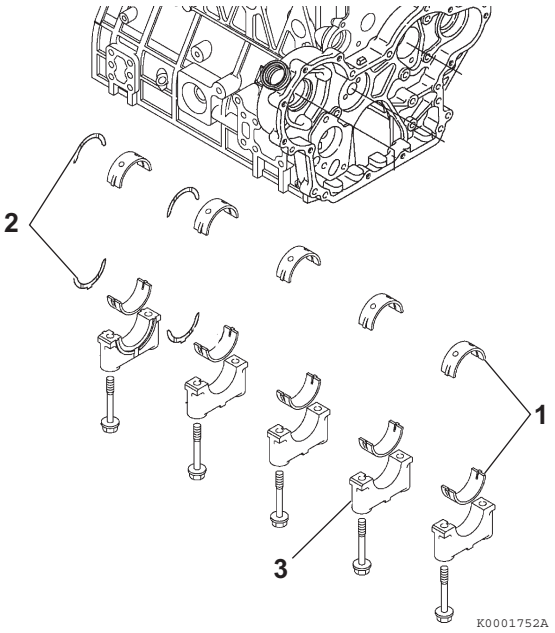


Figure 4-2-59

5. Measure bearing oil clearance prior to removing the crankshaft to determine extent of wear. Record the measurements.

   1- Wipe oil from the bearing insert and crankshaft journal surfaces.

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4-4 Cooling System

4-4-1 Before You Begin Servicing

Before performing any service procedures within this section, read the following safety information and review the *Safety Statements* section on page *4-1-1*.

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4-8 Alternator

4-8-1 Before You Begin Servicing

Before performing any service procedures within this section, read the following safety information and review the *Safety Statements* section on page *4-1-1*.

4-8-2 Introduction

This section of the Service Manual describes the servicing of the alternators. YANMAR Part No. 129423-77200 alternator is used in this section to show the service procedures for the representative alternator. For specific part detail, see the *Parts Catalog* for the engine you are working on.

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Fuel Temperature Sensor (equipped on supply pump)

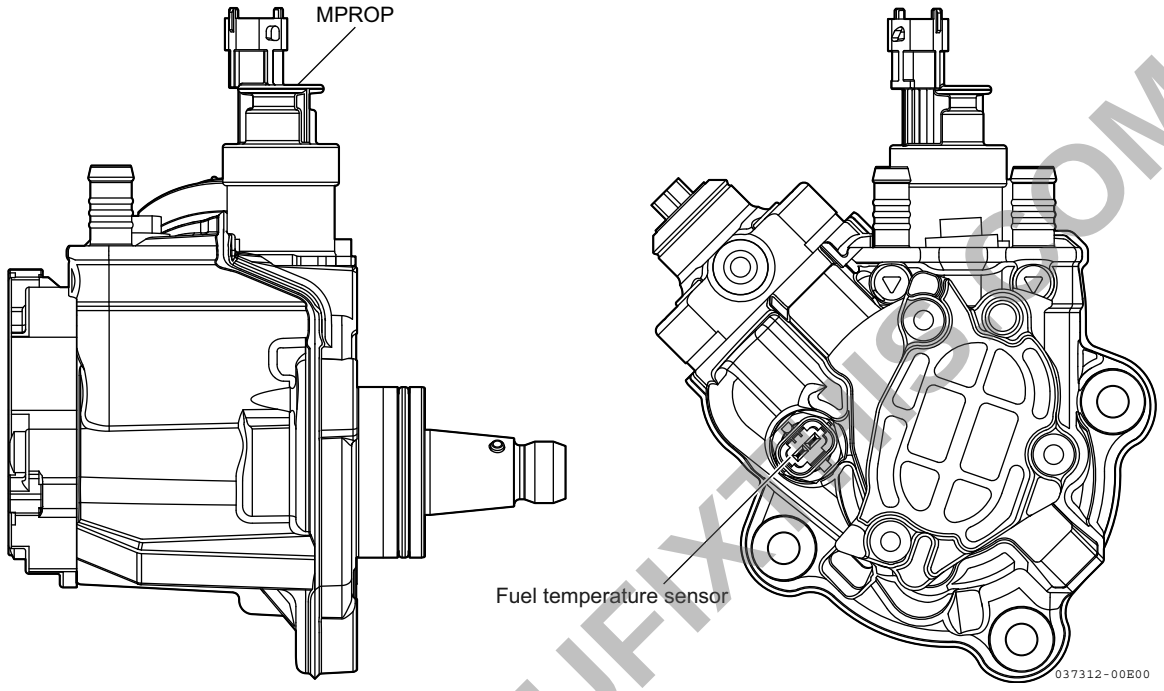


Figure 4-9-45

Part No.	129A00-51200
Sensor installation tightening torque	28 ± 2 N·m

Cooling Water Temperature Sensor

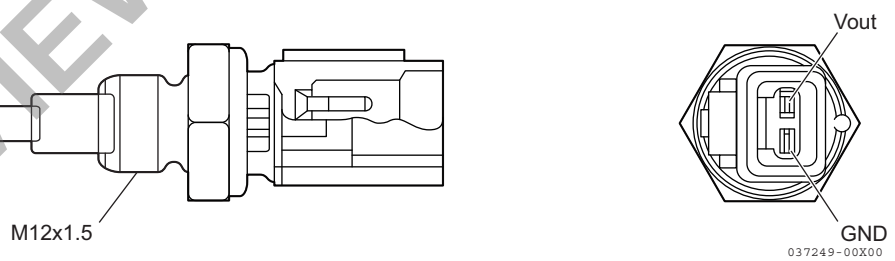


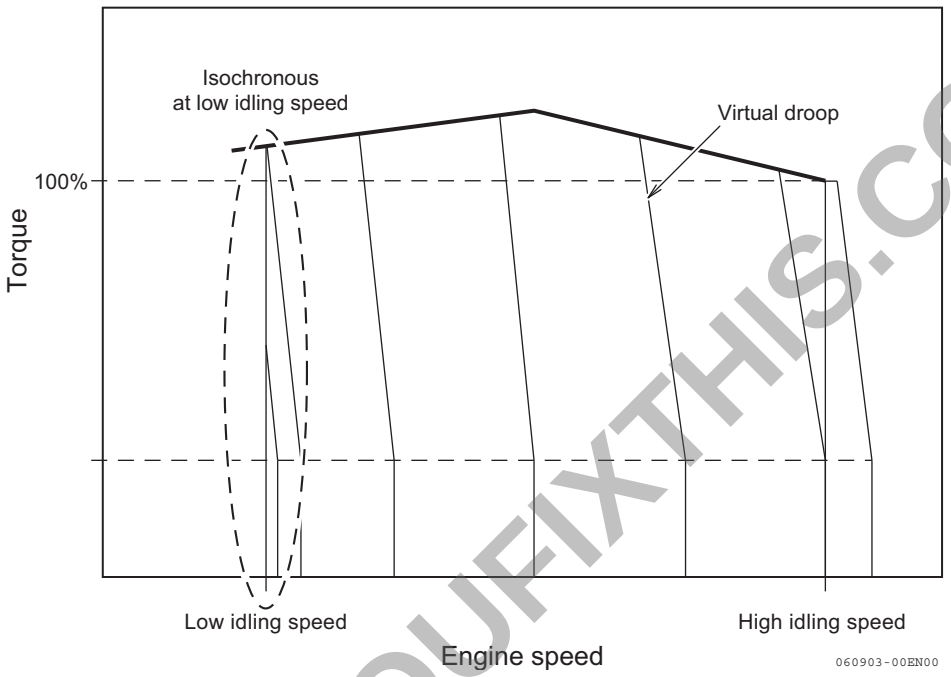
Figure 4-9-46

Part No.	129927-44900
Sensor installation tightening torque	22 ± 2 N·m

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Iso-chronous Control at Low Idle Speed

The engine can be configured so that the engine speed will not decrease lower than the low-idling speed even while the virtual droop is active.



Iso-chronous control at low idle speed

● **EGR control**

The common rail engine provides NOx reduction by installing an electronic control EGR valve.

The engine ECU calculates the EGR valve opening based on the engine speed, engine load factor, intake air temperature/EGR temperature/exhaust gas temperature, and EGR downstream/upstream pressures (intake air pressure/exhaust air pressure) and adjusts the exhaust gas recirculation volume by controlling the EGR valve.

The EGR valve is active under normal warm conditions, however, it is designed not to open when the coolant temperature is 60 °C or lower in order to prevent sulfuric acid corrosion of the engine under cold conditions due to concentration of exhaust gas components.

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6-1-2 Additional Operation of Control Valve

Applicable S/N: 21087 and below

Control in swing motor mechanical brake release pilot line

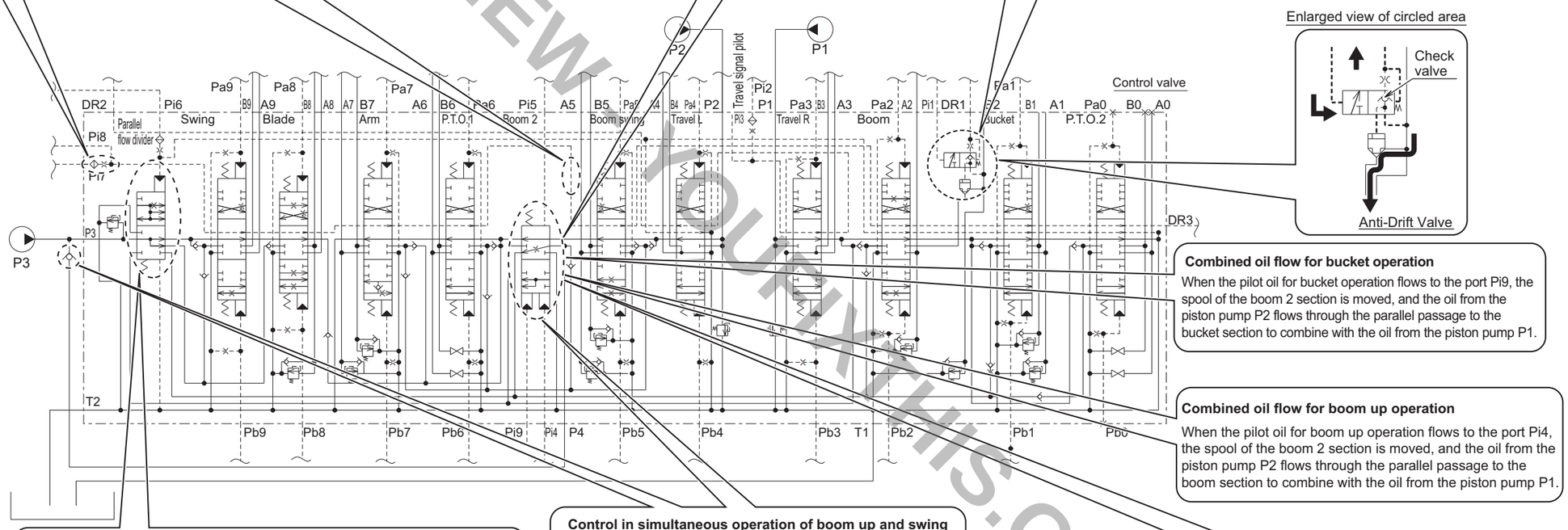
The oil discharged from the cut-off valve is supplied to each of the swing, blade, arm, P.T.O.1, boom swing, boom, bucket and P.T.O.2 sections through the port Pi7 and flows back to the hydraulic oil tank. When one of these sections is actuated, the spool blocks the oil and the pilot pressure is caused.
The pilot pressure flows through the port Pi8 to the port PP of the swing motor mechanical brake to open the swing brake release valve.
Therefore, the swing motor mechanical brake is not released before any of the swing, blade, arm, P.T.O.1, boom swing, boom, bucket or P.T.O.2 is operated.
(The swing brake is released by operation except for the travel sections.)

Combined oil flow for arm operation

As long as all the sections upstream the arm section for the piston pump P2 and the gear pump P3 are in neutral, all the oil from the piston pump P2 and that from the gear pump P3 are combined in the arm section, and the combined oil flows to the arm cylinder.
However, when the boom or bucket section of the piston pump P1 circuit is operated, some of the oil from the piston pump P2 flows to that section; therefore, not all the amount of oil from the piston pump P2 is combined.

Anti-drift valve (Reduction of boom drifting)

The anti-drift valve is installed in the bottom end circuit of the boom cylinder. The valve keeps blocking the oil in the circuit while the boom is not operated, in order to prevent the boom from drifting due to internal leakage from the clearance between the control valve body and the spool.
When the boom control lever is pushed forward, the pilot oil pressure for the boom down operation is led to the port Pi1 and opens the check valve to keep the circuit function as the low pressure return passage.



Combined oil flow for bucket operation

When the pilot oil for bucket operation flows to the port Pi9, the spool of the boom 2 section is moved, and the oil from the piston pump P2 flows through the parallel passage to the bucket section to combine with the oil from the piston pump P1.

Combined oil flow for boom up operation

When the pilot oil for boom up operation flows to the port Pi4, the spool of the boom 2 section is moved, and the oil from the piston pump P2 flows through the parallel passage to the boom section to combine with the oil from the piston pump P1.

Non-deviation travel

The oil from the pilot oil pump P4 flows to the port Pi6, then flows in parallel through the travel (L) section and the boom and bucket sections, and returns to the hydraulic oil tank.
When the travel (L) section is operated and simultaneously the boom or bucket section is also operated, the pressure develops in the circuit from the port Pi6 and the spool of the parallel-flow divider section is moved.
At that time, the oil from the gear pump P3 is divided at the parallel-flow divider and supplied to the swing section, the arm section and the boom and bucket sections.
Consequently, even when the oil from the piston pumps P1 and P2 flows only to the travel (R) and travel (L) sections, respectively, in the most upstream for the piston pumps P1 and P2, the swing, the arm, the boom, or the bucket can be operated.
In other words, the machine can travel with no deviation even when any of the control levers are moved during the traveling of the machine.

Control in simultaneous operation of boom up and swing

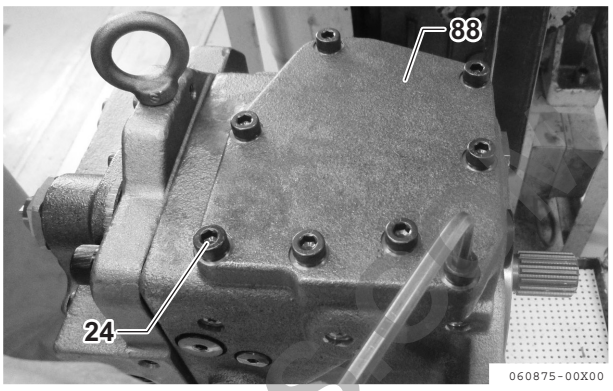
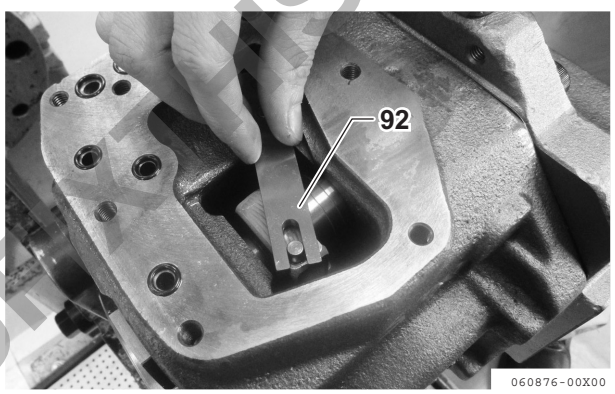
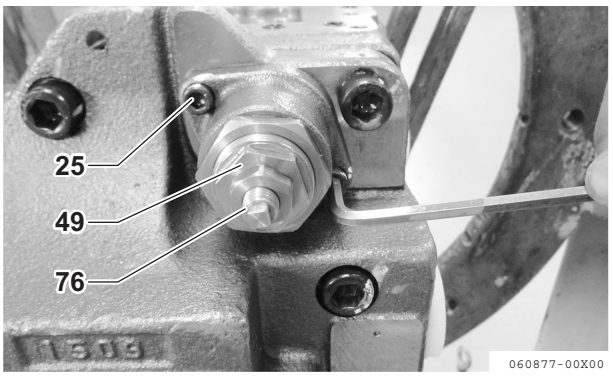
When the boom up and swing are operated simultaneously, the oil from the gear pump P3 flows through the check valve and the boom 2 section to the boom section to combine with the oil from piston pumps P1 and P2.

Control in simultaneous operation of boom up and arm retract

As mentioned in Section "6. Combined Oil Flow for Boom Up Operation", the oil from the piston pumps P1 and P2 is combined in the boom up operation. However, when boom up and arm retract are operated simultaneously, the pilot oil pressure for the arm retract operation is led to the port Pi5 and moves the spool of the boom 2 section back to give priority to the arm retract operation.

061427-00EN01

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Procedure	
(5) Remove the hexagon socket head bolts **24**, the top cover assembly **88** and the sheet packing T **71**. Then take the feedback lever assembly **92** out of the pump casing (F) **15**.	 
(6) Remove the hexagon socket head bolts **25** and remove the spring cover assembly **87** from the valve cover **17**. ***Note:*** *Do not loosen the lock nut (C) **49** and hexagon nut **76** of the spring cover. Doing so will cause the control characteristics to change.*	

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6-4-9 Troubleshooting

Before performing any test, visually inspect the complete hydraulic system for oil leakage and for parts damage.

WARNING:
To prevent personal injury, when testing and adjusting the hydraulic system, move the machine to a smooth horizontal location and lower the mast and carriage to the ground. If the mast and carriage can not be on the ground, make sure they are blocked correctly to keep them from falling unexpectedly. Move away from machines and personnel that are at work. There must be only one operator. Keep other personnel away from the machine, or in a location where the operator can see them.
Before any hydraulic plug, line or component is removed, make sure all hydraulic pressure in the system is released.

Symptom: Spool cannot be stroked or attachment speed is not correct.

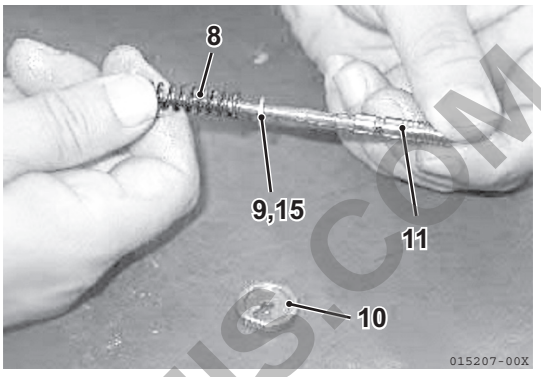
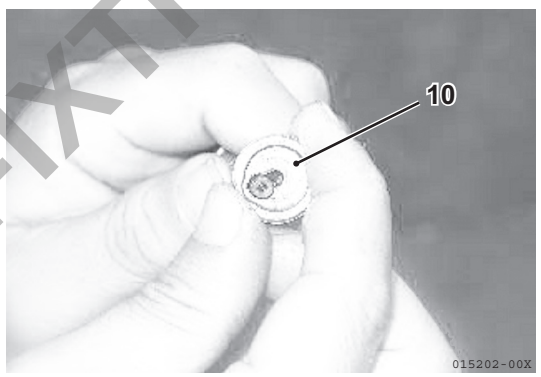
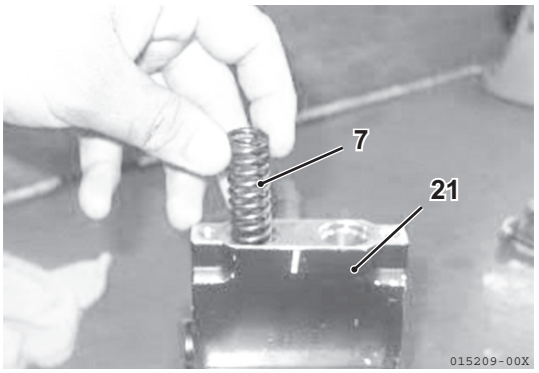
Check point	Correction
Hydraulic fluid temperature is too high.	Remove resistance in the circuit.
Contamination.	Flush the circuit and exchange hydraulic fluid.
Too much torque to tighten connector.	Check tightening torque.
Deformative valve housing by improper mounting.	Loosen the mounting bolts and check the flatness.
Pressure is too high.	Check pump pressure and work port pressure.
Spool is bent.	Exchange spool section assembly.
Return spring damage.	Exchange parts.
Out of alignment for spring and cap.	Loosen socket head bolt for pilot cap and tighten again.
Pilot pressure is not high enough.	Check pilot valve and pilot relief pressure.
Compensator spool is stuck.	Clean up or exchange spool section assembly.

Symptom: Load cannot be held.

Check point	Correction
Leakage in cylinder.	Check the cylinder.
Leakage from spool.	Check for scratches on spool.
Leakage from overload relief valve.	Clean up valve housing and relief valve.
Leakage from anti-drift valve.	Disassemble anti-drift valve unit and clean up. Check for damage or scratches.
Contamination in load check valve.	Clean up load check valve. Exchange check valve or spool section depending on damage.

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4) Reassembly

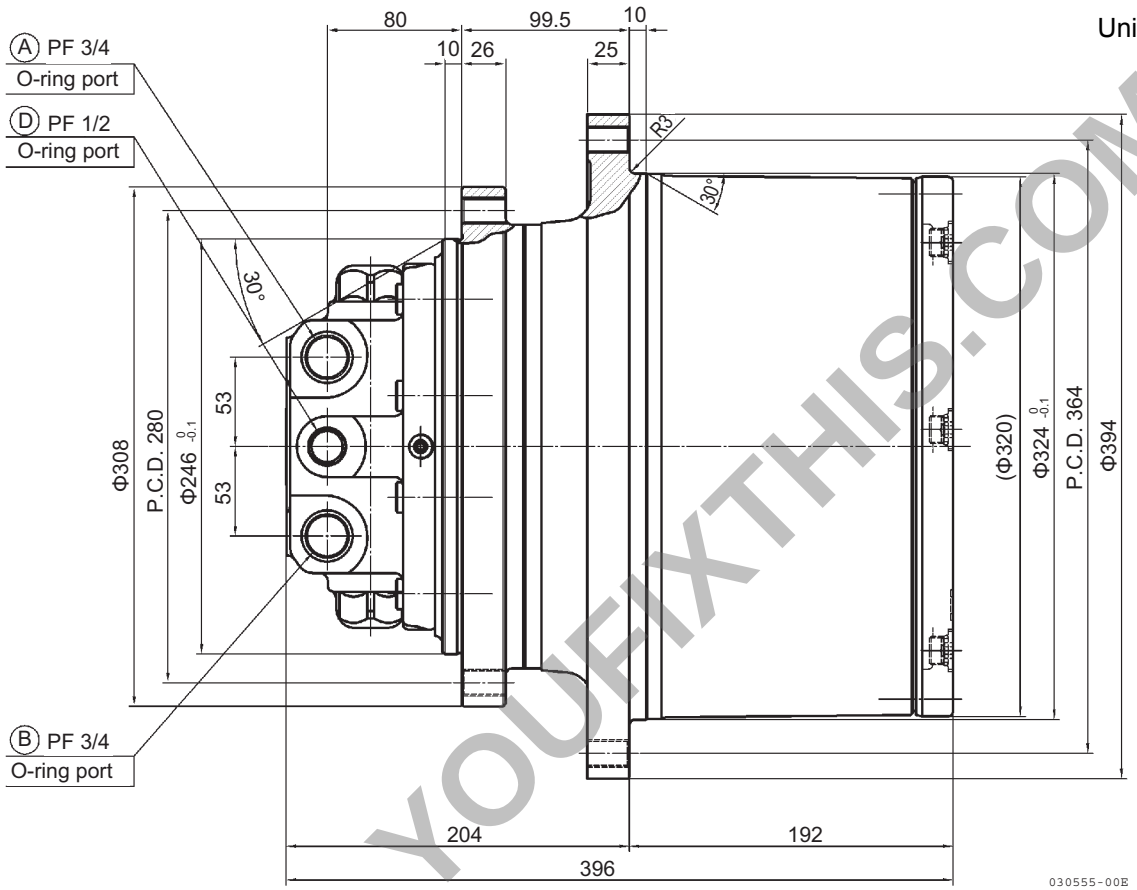
Procedure	
(1) Install washer **9**, shim **15** and spring **8** on spool **11** in order. ***Note :*** *Washer **9** is used for presetting of spring **8**. Its thickness differs assembly by assembly and some may have no washer **9**.*	
(2) Install spring seat on spool **11** through larger opening of it, press spring seat to bow spring and laterally displace spring seat to fix it on spool **11**. ***Notes :*** • *Be careful not to damage spool surface.* • *Do not press down spring seat **10** more than 0.16 in.(4 mm).*	
(3) Fix casing **21** on a vise with using buffing plates and install spring **7** on casing **21**. ***Note :*** *Reinstall the part to the original position before disassembling.*	

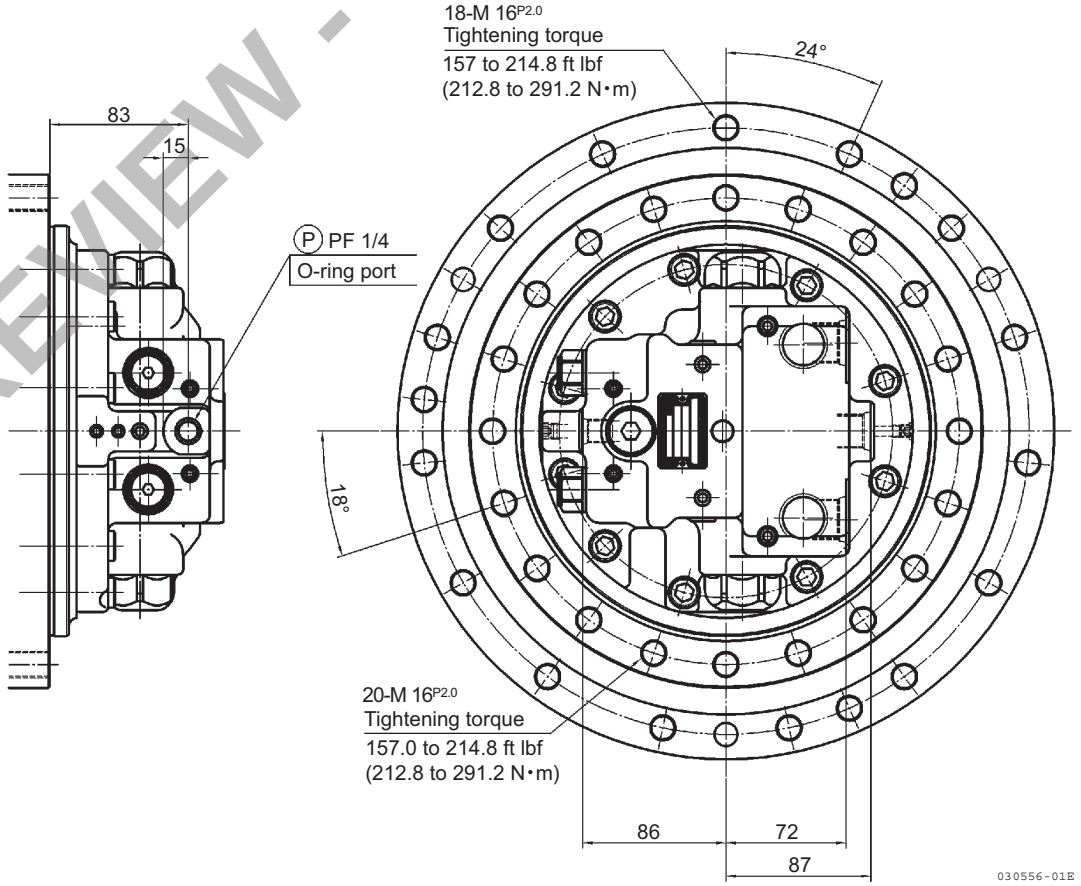
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6-7-2 External Dimensions and Circuit Diagram

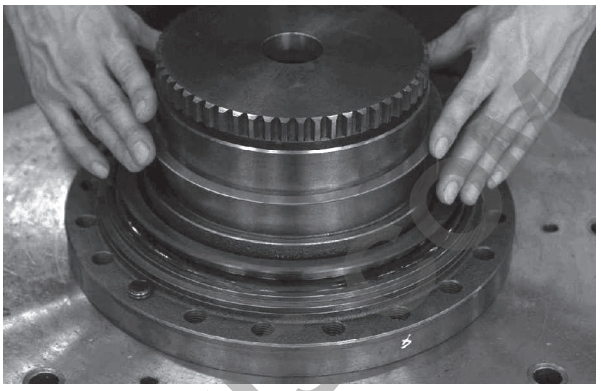
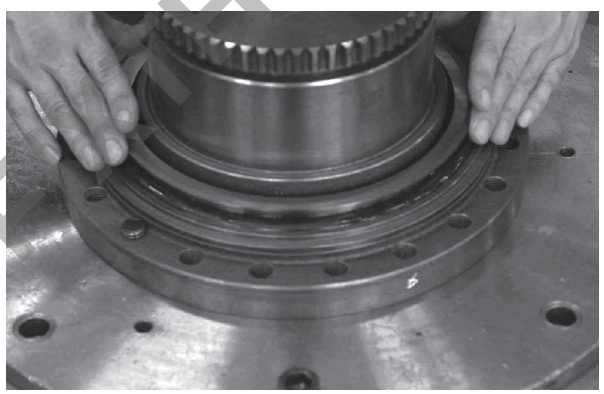
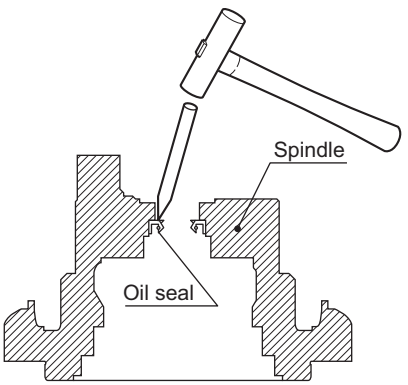
1. External Dimensions

Unit: mm





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Procedure	
24. Removing spindle fittings (1) Remove shim **23** from spindle **2**.	
(2) Remove floating seal **29** from spindle **2**. ***Note:*** *Do not reuse floating seal **29** which have been removed.*	
(3) Remove oil seal **132** from spindle **2**. ***Note:*** *Do not reuse oil seal **132** which have been removed.*	

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6-11-6 Installation

Pay the following attention when installing the valve:

- Take care to give the valve no stress by the pipings.
- Tighten all the installation bolts evenly and thoroughly.
- The valve must note that seals might be damaged by the excessive heat and the spatter when the welding work is done soon in the vicinity.
- Do not remove the cover or plug of each port until the time of piping for the going into it prevention of dust or foreign material.
- Obtain the linkage axially to operate the spool within 3°.

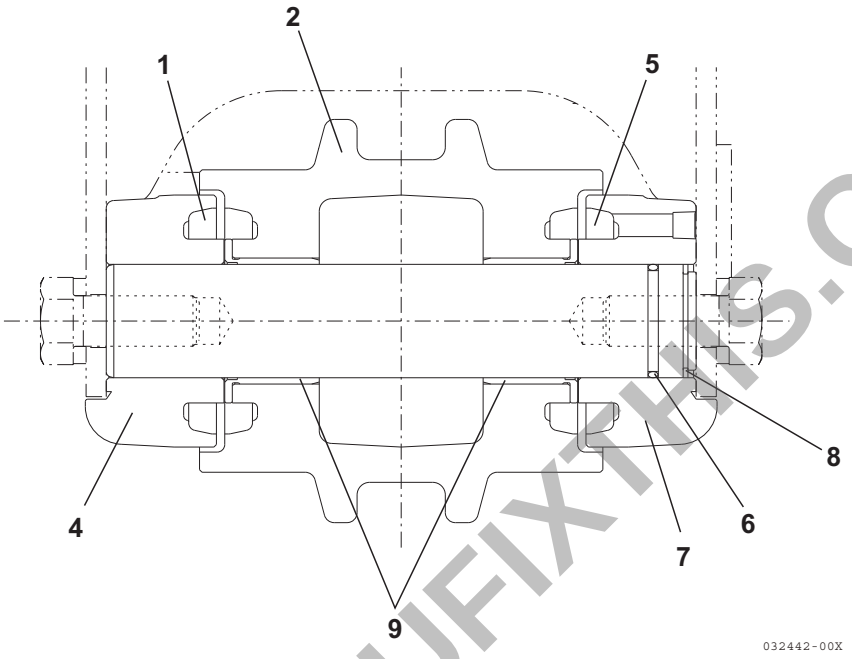
6-11-7 Running

- It is confirmed that pressure is gradually raised after it is confirmed that the valve array is normal, and the hydraulic fluid is clean (a low idol operates the working machine the inching), and there is no external leakage.
- The oil pressure hydraulic fluid must be used, and the aniline point must use from 179.6 to 235.4 °F (82 to 113 °C) for oil.
- Do not raise the relief valve more than the regulated set pressure.
- Work really after doing the warmth driving enough.
- Especially, note the following respect to prevent the stick by the heat shock of the spool when the temperature of the hydraulic fluid and the temperature of the valve start for low.
- Neither the main relief valve nor the overload relief valve are continuously suddenly operated, and operate so that the hydraulic fluid in each actuator may circulate, and raise each part uniformly when you drive warmth.
- Do not do suddenly at the low temperature so that a minute operation and the compound operation may cause partial generation of heat caused by each part orifices.

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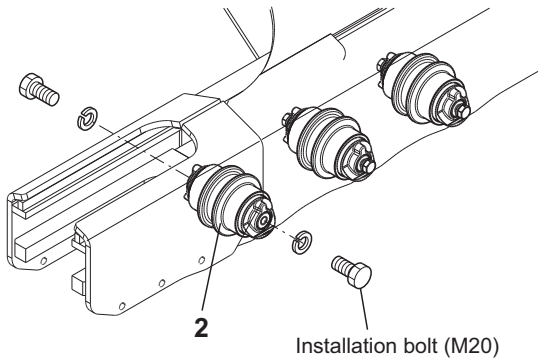
7-2-10 Disassembly and Reassembly of Track Roller

1) Structural and Component Part



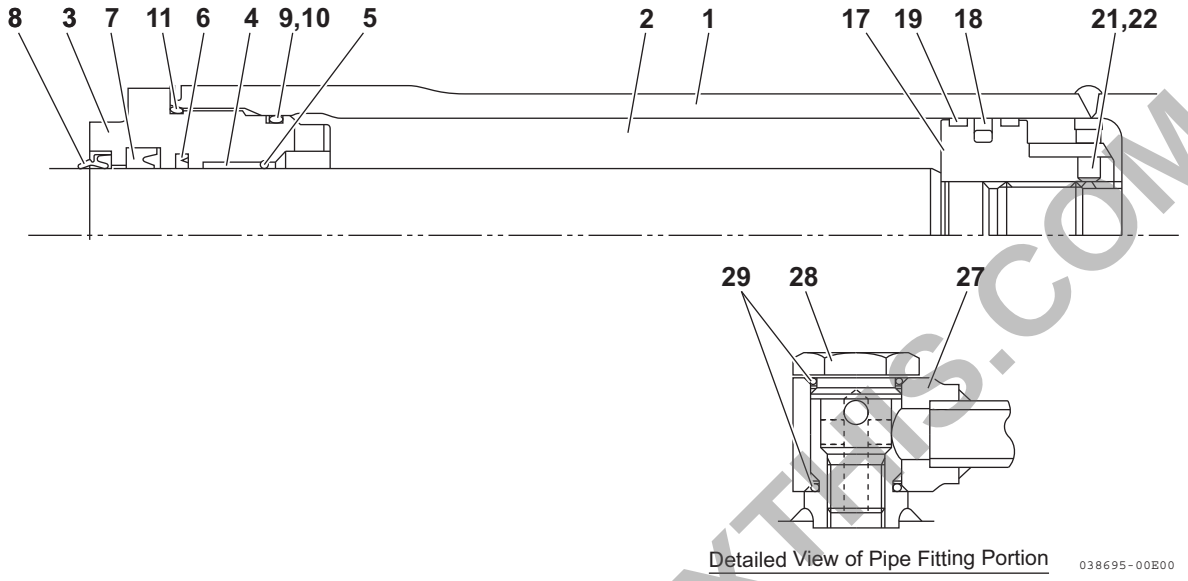
No.	Part	Q'ty	No.	Part	Q'ty
1	Floating seal	1	6	O-ring 1A G40	1
2	Roller	1	7	Seal cover B	1
3	Plug R (PT) 1/8	1	8	Snap ring C (Shaft 45)	1
4	Shaft (with seal cover)	1	9	Bush	2
5	Floating seal	1			

2) Disassembly

Procedure	
(1) Turn the implement 90 degrees to the right or the left and lower it to the ground. Then loosen nipple valve **2** (about 1 turn) and drain the grease. ***Note :*** *If the grease does not come out smoothly from the nipple valve, put down the machine on the ground and move it forward and backward.* (2) Raise the crawler on one side using the boom and loosen the crawler tension to make space for removing track roller **2**. Then, remove track roller **2**. Installation bolt (M20): Adhesive — Loctite 262 or its equivalent; Tightening torque — 325.4 to 361.6 ft•lbf (441.2 to 490.2 N•m)	

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Bucket Cylinder



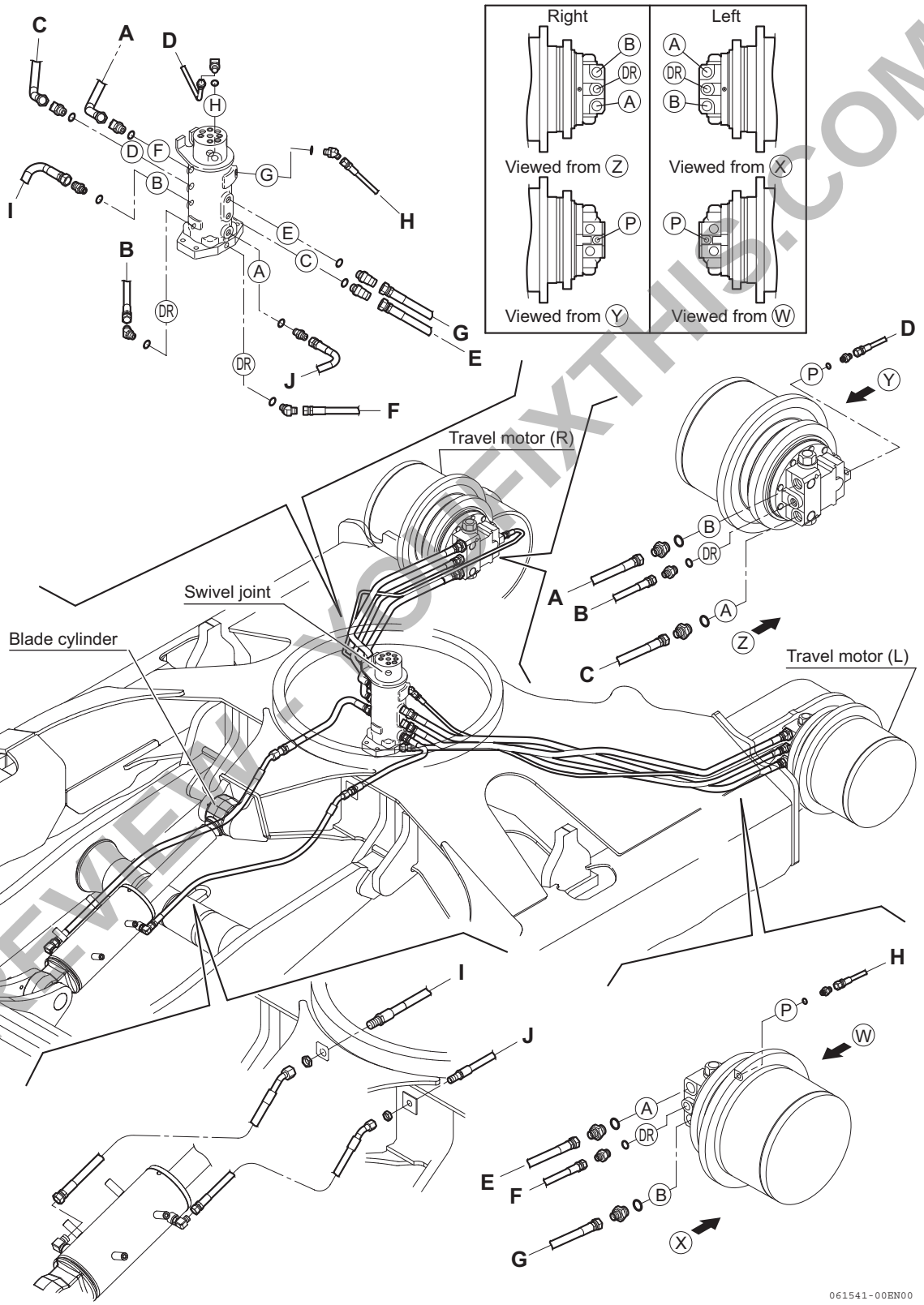
Detailed View of Pipe Fitting Portion 038695-00E00

No.	Part	Boom cylinder	Arm cylinder	Bucket cylinder
1	Cylinder tube ASSY	○	○	○
2	Piston rod ASSY	○	○	○
3	Cylinder head	○	○	○
4	Bush	○	○	○
5	Snap ring	○	○	○
6	Buffer ring	○	○	○
7	U-ring	○	○	○
8	Wiper ring	○	○	○
9	O-ring	○	○	○
10	Buck-up ring	○	○	○
11	O-ring	○	○	○
12	Holder	○	○	—
13	Cushion seal	○	○	—
14	Collar	○	○	—
15	Buck-up ring	○	○	—
16	Cushion bearing	○	○	—
17	Piston	○	○	○
18	Seal ring ASSY	○	○	○
19	Slide ring	○	○	○
20	Nut	○	○	—
21	Setting screw	○	○	○
22	Steel ball	○	○	○
23	Cushion bearing	—	○	—
24	Cushion seal	—	○	—
25	Snap ring	—	○	—
26	Stopper	—	○	—
27	Pipe ASSY	○	—	○
28	Plug	○	—	○
29	O-ring	○	—	○
30	Buck-up ring	○	—	—

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6) Undercarriage

• Swivel joint ←→ travel motor and blade cylinder



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